Surface activity of a fluorinated carbohydrate ester in water/carbon dioxide emulsions

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Résumé en anglais	The water/carbon dioxide (W/CO2) interfacial activity and emulsifying capacity of hydrocarbon and fluorinated carbohydrate esters are investigated of the first time and compared to the performance of sodium-bis(2-ethylhexyl)sulfosuccinate (AOT). The reduction of the W/CO2 interfacial tension was measured using a pendant drop tensiometer equipped with a cell view pressurized with CO2 at 80 bar and 45 °C. It was found that the interface stabilization improved in the order AOT < 6-O-myristoyl mannose < 6-O-(2H,2H,3H,3H-perfluoroundecanoyl)-D-mannose. In the latter case, a drastic reduction of the W/CO2 interfacial tension was observed (85% reduction, interfacial tension at the equilibrium = 3.6 mN/m), which emphasizes the advantage of using a fluorinated CO2-philic tail and the potential of sugars as hydrophilic head. The formulation of stable W/CO2 emulsions was also achieved using the fluorinated mannose derivative. This study paves the way to the design of a novel class of competitive surface active agents for W/CO2 emulsions.
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